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and only recognized on receiving other specimens with the lower leaves, which are very distinct. *Cardamine Clematitis*, Shuttleworth, was collected by Dr. Gray and party on Roan Mt., during the southern trip of last summer. It was collected before by Rugel in 1844. Dr. Gray had confounded a specimen of it with *C. rotundifolia*, this being the only authority for attributing sometimes to that species trisected leaves, as is done in the Manual for the Northern States. Two new *Astragali* are described, both discovered in Oregon by Jos. Howell. *Elephantopus nudatus* is added to our flora, being found in Delaware. It is the *E. scaber* of Torr. and Gray's Flora. The *Leptoclinium* section of the genus *Liatris* is raised to generic rank. Dr. Garber adds a new *Liatris* from Florida, which bears his name. A new *Rhododendron* from North Carolina bears the name of *R. Vaseyi*. In regard to its relations Dr. Gray says: "The American *Azaleas* previously known consist of one aberrant species, *R. Rhodora*, and of a well-marked group (to which *R. Ponticum* also belongs) characterized by a long-tubed funnel-formed corolla and long exserted stamens and style. But the East Asiatic species of the same true *Azalea* subgenus have campanulate or rotate-campanulate corollas, and some of them very deciduous *perulæ* to the separate flower-buds. This most interesting new species is one of that group, and it thus adds another to the now very numerous cases of remarkable relationship between the Chino-Japanese and the Alleghanian floras."—J. M. C.

GREVILLEA FOR SEPTEMBER.—New British Fungi by M. C. Cooke. New Jersey Fungi by M. C. Cooke and J. B. Ellis. A notice of Dr. J. T. Rothrock's final report on the Botany of the Wheeler survey. On *Peniophora* (with plates), a new genus of Hymenocetous Fungi, by M. C. Cooke. Experiment on the Calorific Properties of Lichens by W. Lander Lindsay. New British Lichens by Rev. J. M. Crombie. A notice of a series of microscopical mountings of Lichens by Mr. W. Joshua. The Lichen Flora of Great Britain by Rev. W. A. Leighton, a new edition, the 3rd, just issued. New Fungi of the Jura by Dr. L. Quelet.—A. P. M.

DISTINCTION BETWEEN *CAREX INTUMESCENS* AND *C. GRAYI*.—Mr. W. B. Hemsley, in the Journal of Botany, states that he has discovered a very good distinctive character between *Carex intumescens*, Rudge, and *C. Grayi*, Carey, which is not mentioned in the definition of the species in either "Gray's Manual" or "Boott's Illustrations." This differential character is in the achenes; "those of *C. Grayi* being

nearly globular, with a slender style, and indistinctly three-ribbed; whilst those of *C. intumescens* are elongated and sharply triangular, with concave facets."—A. P. M.

THE GYMNASPERMY OF CONIFERÆ.—A paper in *Flora* for June, 1879, nos. 17 and 18, bears this title and is written by Dr. L. Celakovsky. In the *Am. Journal* for October, it is reviewed by Drs. Engelmann and Gray, as follows: Celakovsky, who takes a high position as a morphological botanist, mentions that in the year 1874, he published in *Flora* an article opposing gymnospermy. He now announces that he has changed his opinion, having satisfied himself of the truth of this doctrine. The agent of conversion was a monstrosity of the Norway Spruce cone, like that from which Stengel made out the now accepted morphology of the cone, and the same monstrosity as that which Braun studied in the Larch, deducing from it the accepted doctrine many years ago. The essential point in this monstrosity is that the bracts of the abnormal catkin develop into leaves, and the carpellary scale before it into a pair of leaves transverse to the bract. The abietinous carpel consists of these two leaves united by their posterior edges (*i. e.*, those next the axis of the cone) into a scale, the back of which therefore faces the axis of the cone, and bears the ovules. The lower part of these catkins is usually normal, the apex by proliferation is gradually transformed in the manner here specified, and becomes a leafy branch. Dr. Engelmann, in this *Journal*, three years ago, gave a confirmatory account of an analogous monstrosity in the Hemlock Spruce, but in which the transformation was at the base of the cone, the lower bracts leaf-like and with a pair of leaves in their axil, the following bracts more and more scale-like, the geminate leaves in their axil were partially united, next forming a scale with a cleft or notched apex, then an entire carpellary scale, in the axil of a normal bract.

Celakovsky, having now seen the Spruce monstrosity for himself, adopts the inevitable conclusion, and applies it well to the settling of the question of gymnospermy. He declares that the dorsal origin of the ovules of the *Abietinæ* proves that it is no axillary production, and thus the main support of those who take the ovule for a simplified female flower falls to the ground. Moreover, the ovules of *Coniferæ* in retrograde metamorphosis never change into shoots, but simply disappear. If flowers, they would be expected sometimes to become foliaceous branchlets. So Celakovsky regards it as demonstrated that they are outgrowths from the dorsal face of the leaf, an-

alogous to the sori and indusia of Ferns. He cites the indusium of *Hymenophyllum* as an instructive analogue, only it is marginal; that of *Davalia* is somewhat dorsal; that of *Cyathea* wholly so and yet cup-shaped. He goes on to say that the gymnospermy of *Abietinæ* being thus proved, that of the rest of *Coniferæ* follows of course; that Braun has seen similar proliferation in the catkins of *Taxodineæ*, in which the carpel-scale in *Abietinæ* consists of two leaves, the bud may in other cases develop more than two leaves, so that the lobed scale of *Cryptomeria* may be composed of as many leaves as there are lobes. Moreover, although the ovules in *Abietinæ* originate from the scale, the greater part of the scale is developed after the formation of the ovules; and in *Cupressus* the scale is developed even as late as the following spring, while the ovules are produced in the autumn. However the case may be disguised, Celakovsky asserts his firm conviction, 1st, that an ovule can only be developed as depending on a carpel, and, 2d, that its nucleus represents the macrosporangium of vascular Cryptogams. He adds that this is the logical consequence of the theory of descent, and must be true if the doctrine of the genetic connection of the vegetable world is true. He considers that Van Tieghem and Strassburger have proved the seemingly simple scale of *Cupressinæ* and *Taxodineæ* to be composed of bract and carpel-scale united [which indeed is evident in *Taxodineæ*], and that Braun has confirmed this by the study of proliferous cones. As to the development of ovules earlier than the carpels they belong to, this is said to have been observed in some Angiosperms also, as in *Cuscuta*, in which at first four naked ovules appear. The anatomical organogenist may argue from this that ovules and carpels are independent productions, but Celakovsky insists that he will argue wrongly.

This brings our author to the consideration of the structure of *Taxinæ*. This is environed with difficulties, and explanation is only conjectural. Here the disc, arillus, cupula, or whatever it be called, makes its appearance where no trace of carpellary scale is to be seen. Celakovsky inclines to the view that this organ, occurring in whatever form, is most probably the carpellary scale itself, very tardily developed. In *Dacrydium* the cupule is homologous with that of *Taxus*, but oblique. *Cephalotaxus* has no scale and no cupule, but seems to correspond with *Cupressinæ*, and shows at maturity a small flattened rudiment between the two ovules, which is probably a rudimental carpel-scale. *Ginkgo* is the most puzzling; yet it seems probable that the biovuliferous peduncle represents the abietinous carpel-

scale, the peduncle itself being its elongated base. The cupule of *Taxus* may be either a simple circular carpel, or may consist of more than one carpel. The apparently terminal ovule of *Taxus* and *Torreya* he would regard as axillary to one of the uppermost subtending bract-scales; for he will not concede that the ovule can be wholly destitute of a carpellary organ. Yet he might do so, in one sense; for if the carpel may develop very late and very imperfectly or very little, it may sometimes not visibly appear at all, and so the phylome be reduced to the ovular outgrowth.

Finally, Celakovsky notes, that if the ovule of *Taxus* and *Torreya* be axillary to an uppermost scale, it would originate not from the dorsal but from the ventral face, *i. e.* from the upper side of the leaf; which would distinguish *Taxineæ* from all true *Coniferae*,—a view which would not be destitute of important support. For both Braun and Mohl have seen apparently androgynous scales in some *Abietineæ*. In a monstrous Larch ament, among carpellary scales with normally dorsal ovules, Braun found one with ovules on the opposite face; and Mohl describes and figures an androgynous inflorescence of White Spruce, with pollen-sacs on the outer face, and on the other a pair of knobs which from their form and position might be taken for imperfectly developed ovules. But this latter case seems most ambiguous. If it was in a male catkin, the upper part of which had become female by the development of carpel-scales in the axil of stamens partially transformed into bracts (which is the case we have before us in a monstrosity of Hemlock Spruce), then the quasi-androgynous scale in question may have been the normal abietinous carpel-scale itself, with the polleniferous bract behind it and connate with it.

The androgynous spike of Hemlock Spruce before us is below normally staminate; above some anthers are slightly scarious-winged at one side of the projecting tip, another has this wing developed into a bract-like body on the whole of one side; next there is a bract with a single small pollen-sac on one side of its back and in its axil a well-formed and biovulate carpel-scale.